

WHAT IS CLAIMED IS:

1. A semiconductor device comprising:

an active region formed on a substrate from a group III nitride semiconductor; and

5 an insulating oxide film formed in a peripheral portion of said active region on said substrate by oxidizing said group III nitride semiconductor.

2. The semiconductor device of Claim 1,

10 wherein a gate electrode, and a source electrode and a drain electrode sandwiching said gate electrode are formed on said active region.

3. The semiconductor device of Claim 2,

wherein said gate electrode extends from said active region onto said insulating oxide film.

15 4. A plurality of semiconductor devices comprising:

a group III nitride semiconductor formed in a plurality of device formation regions each surrounded with a scribe region on a substrate in a wafer state; and

20 a protection oxide film formed in a peripheral portion of said scribe region on said substrate by oxidizing said group III nitride semiconductor.

5. A semiconductor device comprising:

a pad electrode formed on a substrate; and

25 an insulating oxide film formed between said substrate and said pad electrode by oxidizing a group III nitride

semiconductor.

6. A semiconductor device comprising:

a laser structure formed on a substrate and having a cavity including a plurality of group III nitride semiconductors; and

a protection oxide film formed on side faces of said laser structure including facets of said cavity by oxidizing said group III nitride semiconductors.

7. A method of fabricating a semiconductor device comprising:

a semiconductor layer forming step of forming a group III nitride semiconductor layer on a substrate;

a protection film forming step of forming, on said group III nitride semiconductor layer, a protection film for covering an active region of said group III nitride semiconductor layer;

an oxide film forming step of forming, in a region on said substrate excluding said active region, an insulating oxide film by oxidizing said group III nitride semiconductor layer with said protection film used as a mask; and

an active region exposing step of exposing said active region by removing said protection film.

8. The method of fabricating a semiconductor device of Claim 7, further comprising, after said active region exposing step:

an ohmic electrode forming step of forming an ohmic electrode on said active region; and

a gate electrode forming step of forming, on said active region, a gate electrode extending onto said insulating oxide film.

9. The method of fabricating a semiconductor device of Claim 7, further comprising, between said semiconductor layer forming step and said protection film forming step, an ammonia treatment step of exposing said group III nitride semiconductor laser to ammonia.

10. The method of fabricating a semiconductor device of Claim 9,

wherein said ammonia treatment step includes a sub-step of changing said ammonia into plasma.

11. The method of fabricating a semiconductor device of Claim 7,

wherein said protection film is formed from silicon, silicon oxide or silicon nitride.

12. The method of fabricating a semiconductor device of Claim 7,

wherein said oxide film forming step includes a sub-step of conducting a thermal treatment on said group III nitride semiconductor layer in an oxygen ambient.

13. The method of fabricating a semiconductor device of Claim 7,

wherein said oxide film forming step includes a sub-step of conducting a thermal treatment on said group III nitride semiconductor layer with oxygen ions implanted.

14. A method of fabricating a semiconductor device
5 comprising:

a semiconductor layer forming step of forming a group III nitride semiconductor layer on a substrate in a wafer state;

10 a region setting step of setting, in said group III nitride semiconductor layer, a plurality of device formation regions where devices are to be formed on said group III nitride semiconductor layer and a scribe region for use in dividing said substrate into chips respectively including said device formation regions;

15 a protection film forming step of forming, on said scribe region, a protection film for covering said scribe region; and

20 an oxide film forming step of forming, in a region on sides of said scribe region on said substrate, a protection oxide film by oxidizing said group III nitride semiconductor layer with said protection film used as a mask.

15. The method of fabricating a semiconductor device of Claim 14,

25 wherein said protection film is formed from silicon, silicon oxide or silicon nitride.

16. The method of fabricating a semiconductor device of
Claim 14,

wherein said oxide film forming step includes a sub-
step of conducting a thermal treatment on said group III
5 nitride semiconductor layer in an oxygen ambient.

17. The method of fabricating a semiconductor device of
Claim 14,

wherein said oxide film forming step includes a sub-
step of conducting a thermal treatment on said group III
10 nitride semiconductor layer with oxygen ions implanted.

18. A method of fabricating a semiconductor device
comprising:

a semiconductor layer forming step of forming a group
III nitride semiconductor layer on a substrate;

15 a region setting step of setting, in said group III
nitride semiconductor layer, a device formation region where
a device is to be formed on said group III nitride
semiconductor layer and a pad electrode formation region for
external connection of said device to be formed in said
20 device formation region;

a protection film forming step of forming a protection
film covering a region on said group III nitride
semiconductor layer excluding said pad electrode formation
region;

25 an oxide film forming step of forming an insulating

oxide film in said pad electrode formation region on said substrate by oxidizing said group III nitride semiconductor layer with said protection film used as a mask; and

a step of forming a pad electrode on said insulating oxide film.

19. The method of fabricating a semiconductor device of Claim 18,

wherein said oxide film forming step includes a sub-step of conducting a thermal treatment on said group III nitride semiconductor layer in an oxygen ambient.

20. The method of fabricating a semiconductor device of Claim 18,

wherein said oxide film forming step includes a sub-step of conducting a thermal treatment on said group III nitride semiconductor layer with oxygen ions implanted.

21. A method of fabricating a semiconductor device comprising:

a laser structure forming step of forming, on a substrate, a laser structure having a cavity and including a plurality of group III nitride semiconductor layers by forming said plurality of group III nitride semiconductor layers;

a step of exposing facets of said cavity of said laser structure; and

an oxide film forming step of forming a protection

oxide film on said facets by oxidizing side faces of said laser structure including said facets.

22. The method of fabricating a semiconductor device of Claim 21,

5 wherein said oxide film forming step includes a sub-step of conducting a thermal treatment on said group III nitride semiconductor layers in an oxygen ambient.